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Budding *and* Grafting *on* Hardy Apple Stocks

Ohio
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WHY BUD OR GRAFT?

A good many of the standard commercial varieties of apple trees grown in Ohio are more or less susceptible to winter injury, particularly in the lower crotches and on the trunk. By using for understocks such hardy varieties as Virginia Crab, Hibernal, Haas, and a few others, much of this type of injury can be avoided, and Ohio fruitgrowers are planting increasing numbers of apple trees of known winter hardiness to serve as understocks on which they can work commercial varieties.

The plan usually followed is to set a 1- or 2-year-old tree of the hardy variety in its permanent location in the orchard and then topwork it to the desired variety 2 or 3 years later. The top-working can be done by budding in July or August or by grafting during April or May.

Six to eight scaffold branches in addition to the central leader are chosen for top-working. The buds, or scions, if the tree is grafted, are preferably inserted 15 to 24 inches from the crotch, and in selecting branches for top-working, an effort should be made to avoid crotches with sharp angles. Fortunately, Virginia Crab and Hibernal, the two varieties most commonly used as hardy understocks in Ohio, tend to have wide-angle crotches.

This circular, with its pictures showing the budding and grafting operations step by step, is designed to help growers in their top-working operations.

BUDDING AND GRAFTING ON HARDY APPLE STOCKS

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BUDDING

To be successful, budding should generally be done after either the first or second year; otherwise, it will be necessary to go out too far from the trunk of the tree to find suitable wood for the budding operation.

Buds are taken from growth made during the current season and must be kept from drying out until they are set in position. Those from shoots making sturdy growth are best. The buds are preferably inserted in wood of the current season although they can be set in older wood with fair success. When it is necessary to bud into older wood, it is better to do the budding in late July or early August rather than later, for budding must be done when the bark separates readily from the wood, and on older wood, this period is a little earlier than it is on the current season's growth.

The incision for the bud is made by a vertical cut 1 inch in length and a horizontal cut about half this long made near the upper end of the vertical cut. This incision is commonly called a T. In removing the bud from the bud stick, a shallow shield extending ⅜ inch to ½ inch above and below the bud is taken with the bud. This shield makes it easier to manipulate the bud and also provides additional surface for contacting the cambium layer of the branch.

The bud shield is inserted in the incision and pushed down as far as possible so that it is held firmly in place. After the bud is in place, it is wrapped with raffia, nurserymen's tape, or rubber strips. This wrapper should be cut as soon as the bud has taken.

The spring following the operation, the branch is removed just beyond the bud. There is some advantage in making this cut 2 inches beyond the bud and then later in the year or at the beginning of the second year, removing the stub. Covering the stub with grafting wax or paint facilitates healing.

Budding is probably more difficult than grafting, but it has some advantages over grafting. It can be done more quickly. The union resulting from budding is somewhat stronger the first few years than is that from grafting, and there is less likelihood of breakage. If the buds do not take, grafting can be done the following spring without changing the plan for the tree.

Fig. 1.—Virginia Crab tree at proper stage for top-working by budding, in its second year of growth

Fig. 2.—Two-year-old tree after excess branches have been removed to leave the permanent scaffold branches ready for top-working with the desired variety

Fig. 3.—Locating position for the bud

Fig. 4.—Tools and materials used in budding; from right to left, raffia, bud sticks with variety labeled, budding knife, pruning shears, and rubber bands, sometimes used instead of raffia

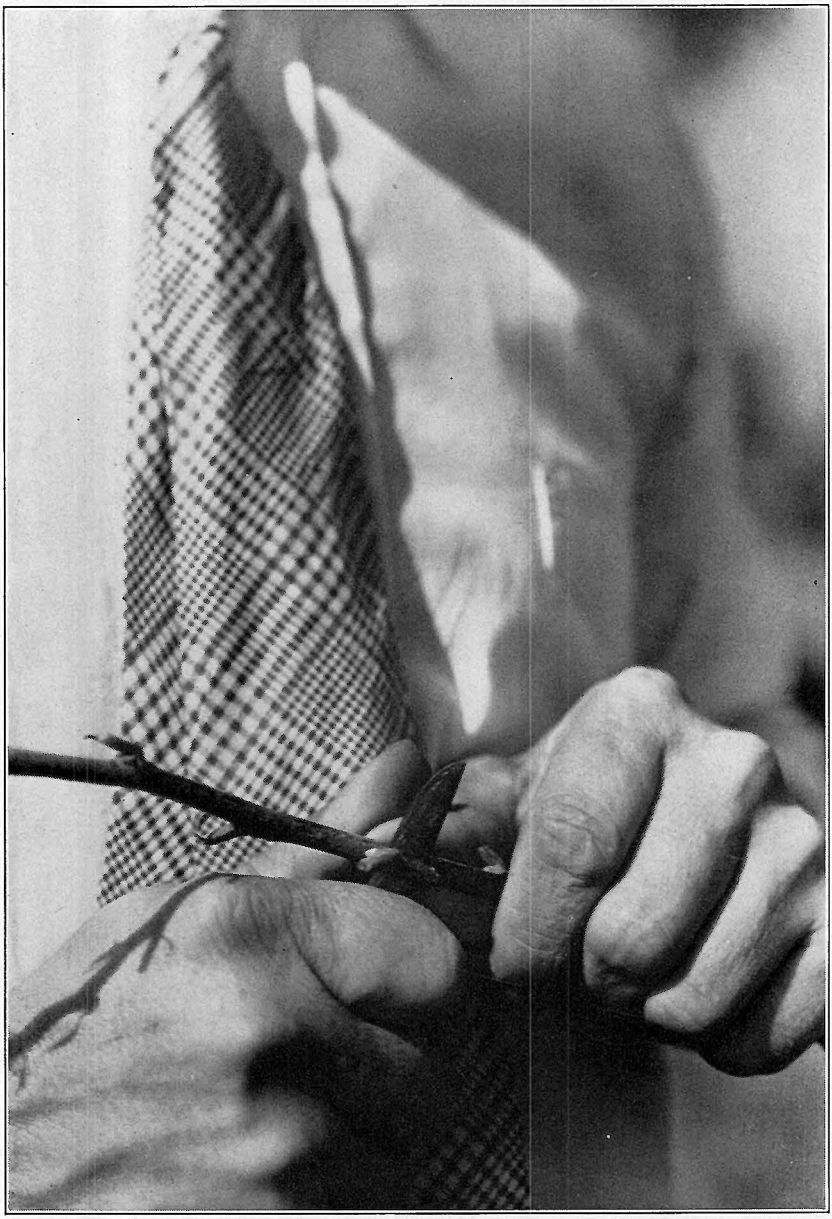

Fig. 5.—Removing the individual bud from the bud stick
Note the shield extending beyond the bud.

Fig. 6.—Making the first cut for the bud incision, as deep as the bark, but not so deep as to disturb the cambium layer

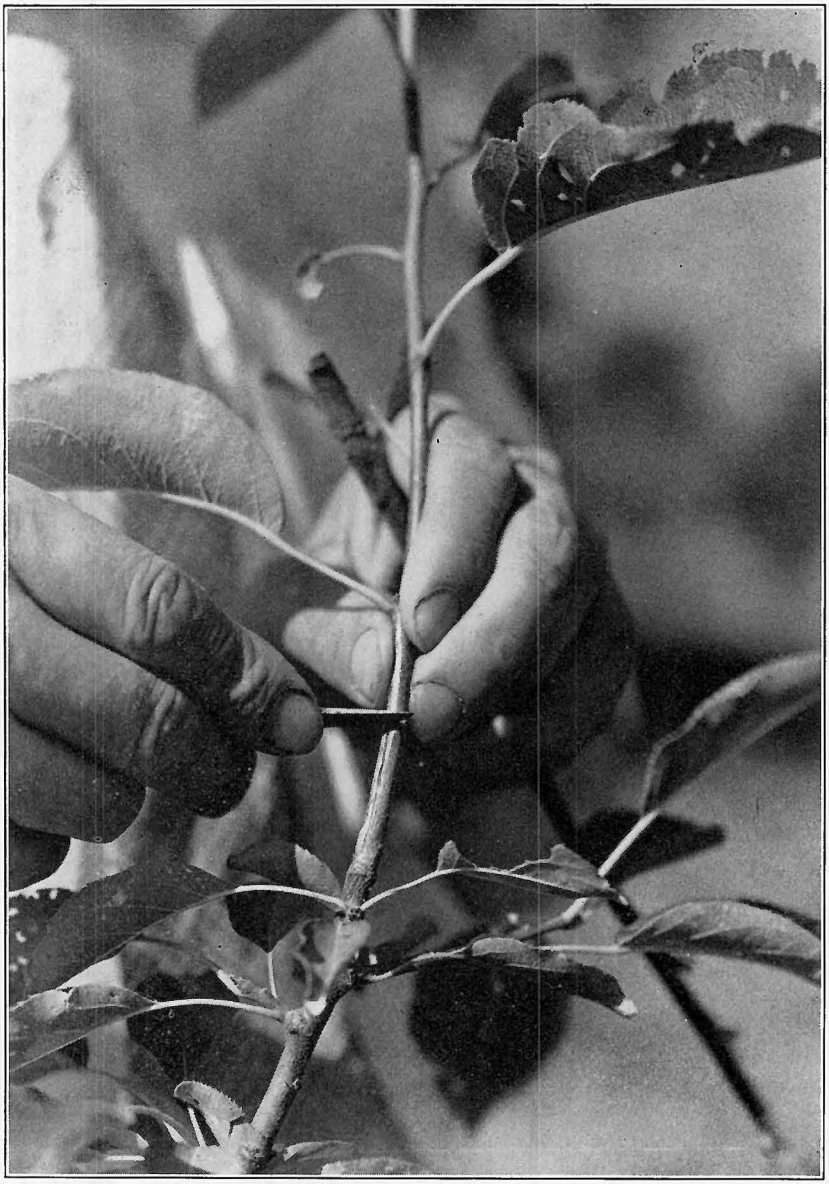

Fig. 7.—Completing the incision by making a horizontal cut and thus forming the T

Fig. 8.—Inserting the bud in the incision

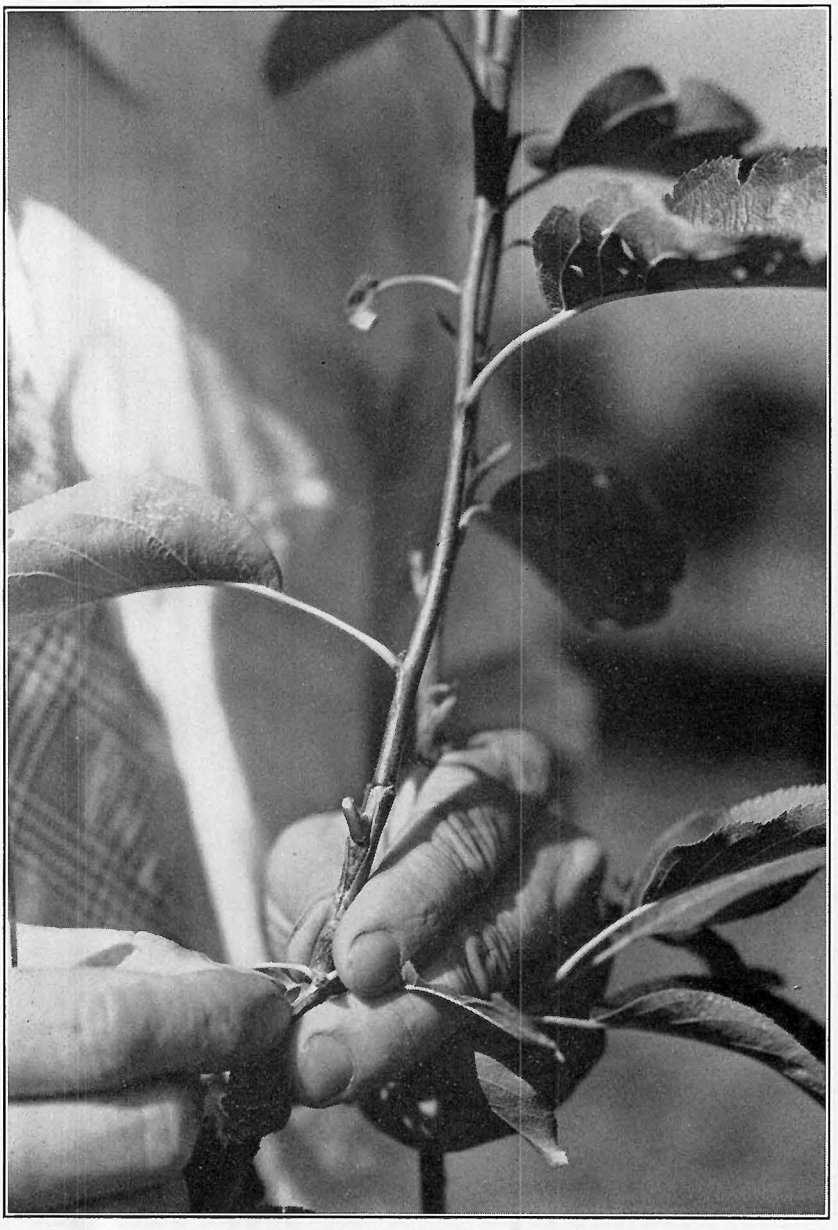

Fig. 9.—The bud in position and ready for wrapping

Fig. 10.—Wrapping the bud with raffia, which is firmly wound around it

Fig. 11.—The completed job

It will be necessary to cut the raffia when the bud has united with the branch.

WHIP GRAFTING

Whip grafting can be used successfully for top-working 2- or 3-year-old trees, and branches ranging from ¼ to ¾ inch in diameter can be whip grafted. For top-working young trees, whip grafting is preferred to cleft grafting wherever it can be used.

Whip grafting is in many ways similar to budding. The permanent scaffold branches are selected, and then the surplus branches are removed, although some of them may be left for a year or two to provide additional leaf area. In the selection of permanent branches, snap clothespins can sometimes be used to mark the places for top-working, and the pins can be shifted from place to place until satisfactory limbs have been selected.

Whip grafting can be done any time during a period extending from 2 or 3 weeks before, to as late as 3 or 4 weeks after, growth starts. Best results are probably secured by grafting about apple blossom time or a week to 10 days later. The scion wood must be kept from drying out and in the dormant state until it is used. Scions must, therefore, be cut well before growth starts. Having the scions in proper condition is more important than the time the work is done.

Scion wood is well-matured growth of the past season. Scions having a diameter of ¼ inch or more at the base are preferable for top-working, and there is an advantage in having the scion and the branch as near the same diameter as possible. Two or three buds are left on each scion. Water sprouts can be used, but less succulent growth is preferable.

The branches selected for grafting are cut as shown in figure 8. A smooth, clean, tapering cut about 2 to 3 inches long is made, and a tongue cut against the grain of the wood. The scion is prepared in the same manner, with the tapering cut of equal length and a tongue similar to that cut in the branch. The scion is pushed firmly into the branch so that the cambium layers of the scion and branch are in contact on one side, and the union is wrapped with nurserymen's tape or homemade cloth strips saturated in grafting wax. Most wrapping materials will need to be cut shortly after the scion starts to grow, although some of the materials used for wraps disintegrate without being cut away.

All competing shoots which develop between the graft union and the trunk are removed during the early summer so that the scion can make the greatest growth possible.

Growers will sometimes find it advantageous to take 2 or more years to top-work young trees. Budding and grafting can both be used on the same tree. When it is necessary to top-work branches having a diameter greater than ¾ inch, cleft grafting should be used.

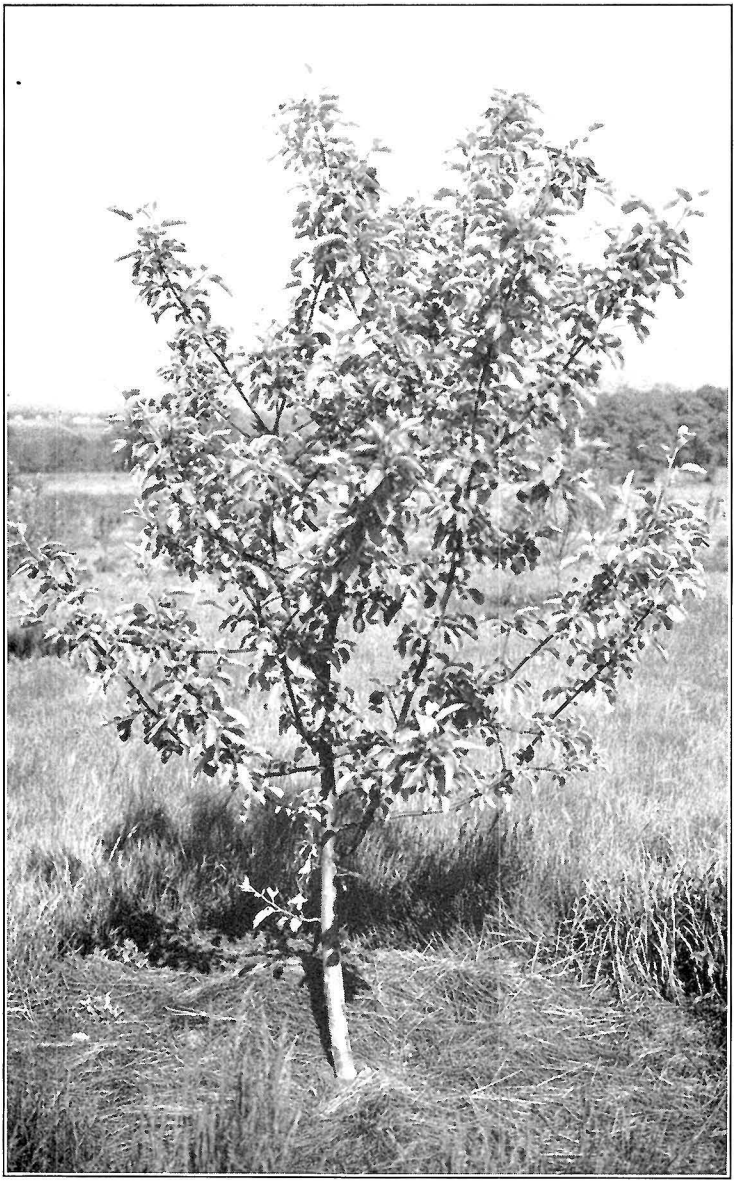

Fig. 1.—Three-year-old Virginia Crab tree about the maximum size for efficient whip grafting

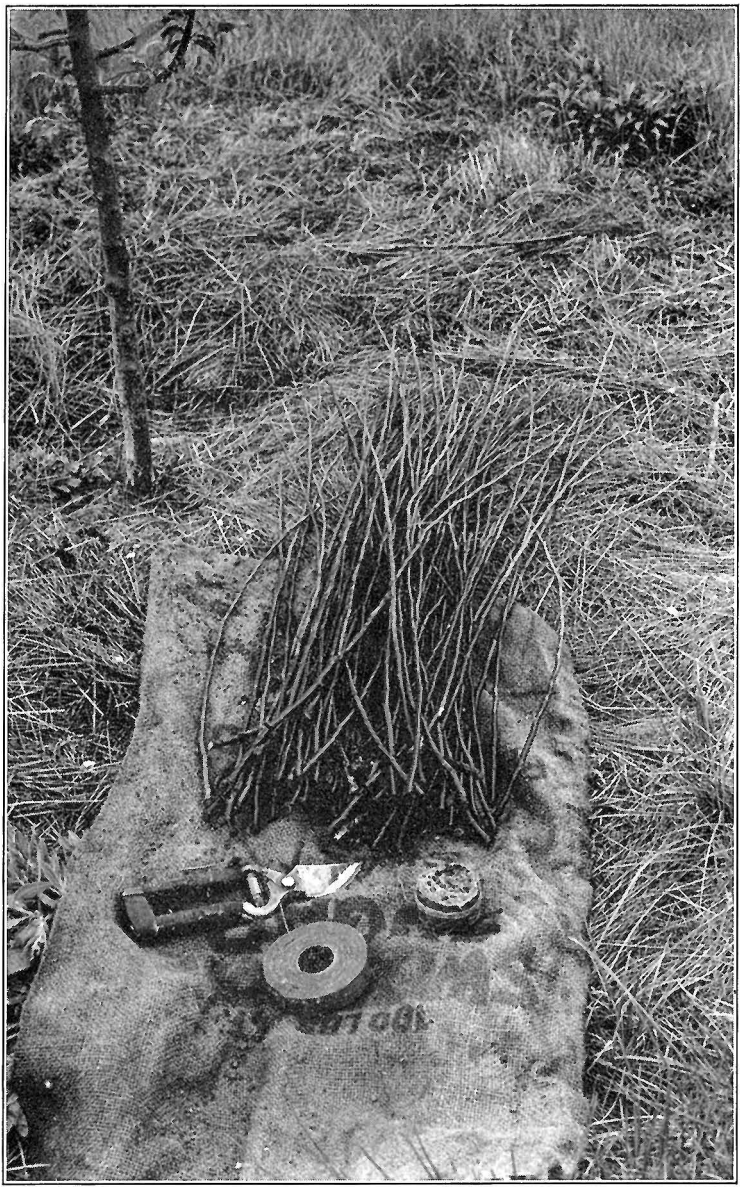

Fig. 2.—The essential materials and supplies for whip grafting scions—pruning shears, nurserymen's tape for wrapping the scions, and grafting wax for covering the tips and exposed cuts

Fig. 3.—The tree with extra branches removed

Fig. 4.—Permanent branches cut back to the proper distance for whip grafting

Fig. 5.—The scions being wrapped

Note that the scion sticks have not been pruned.

Fig. 6.—The scions pruned back to three buds

Fig. 7.—The tips of the scions being waxed to prevent drying out

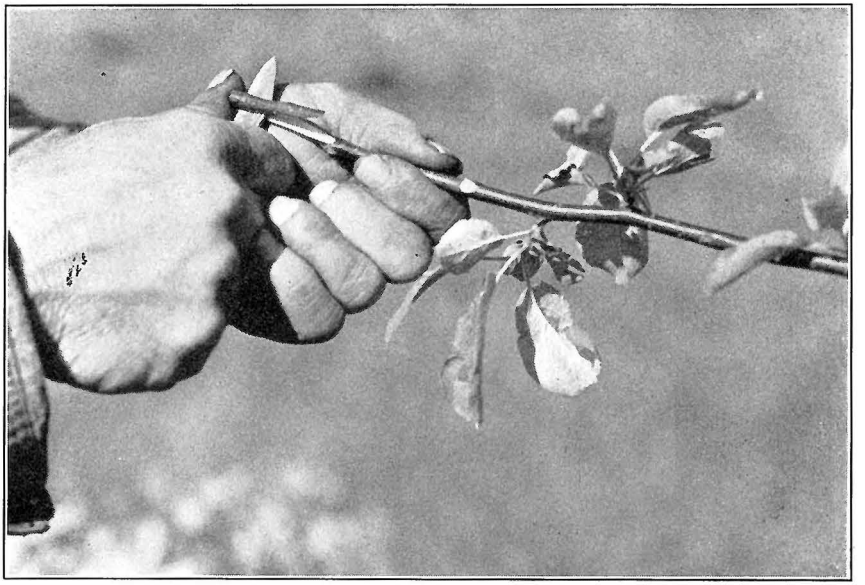

Fig. 8.—Making the first cut on the stock
A slanting 2- to 3-inch surface is desirable.

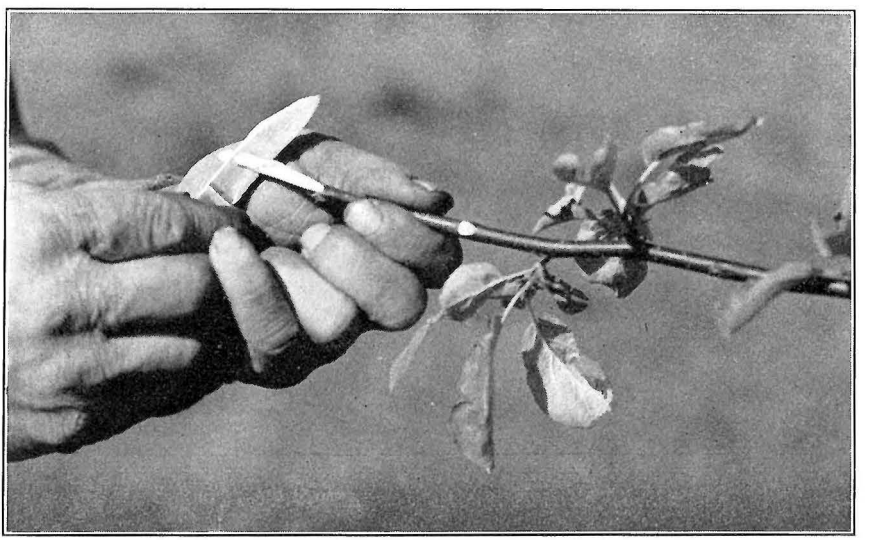

Fig. 9.—Making the tongue in the stock

Fig. 10.—Matching the cut of scion and stock, an important operation

Fig. 11.—Making the tongue in the scion

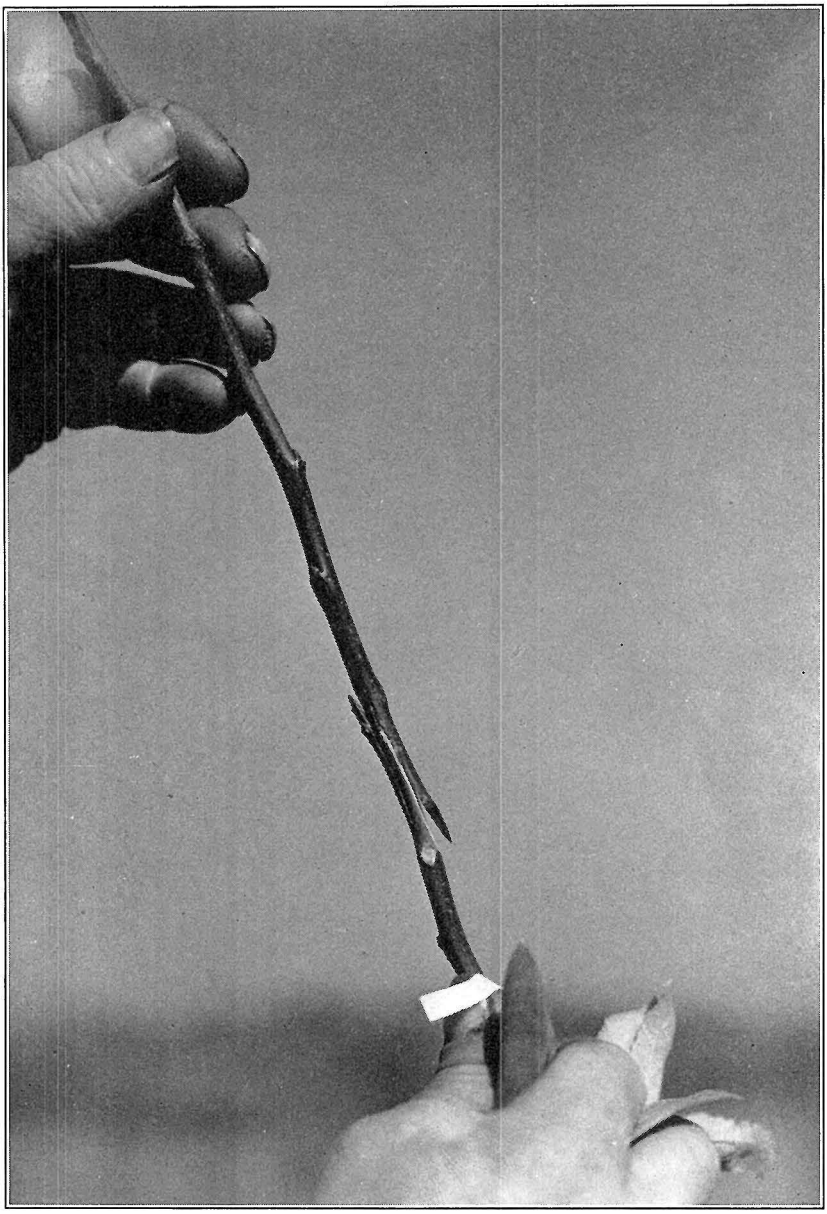

Fig. 12.—Placing the scion in the stock

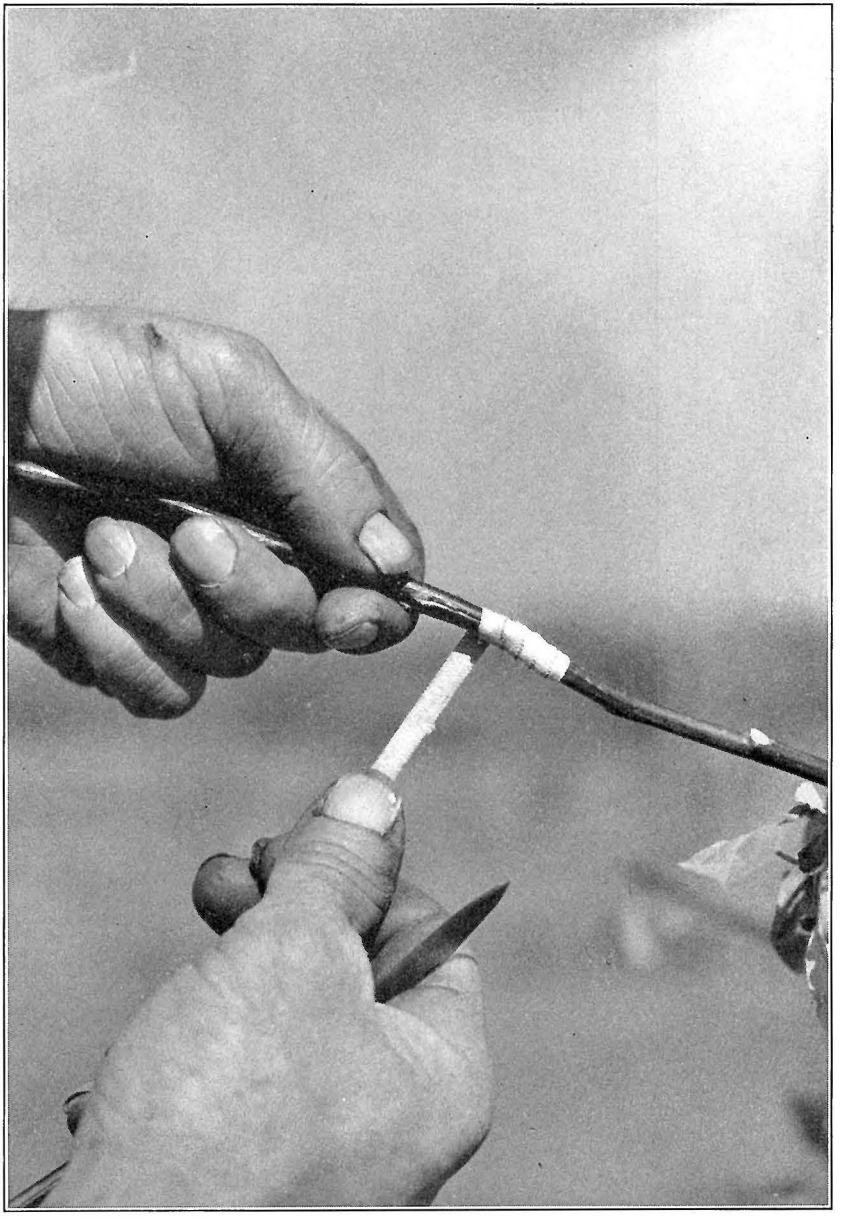

Fig. 13.—Wrapping the scion and stock securely with nurserymen's tape to exclude air and hold them in position

This type of wrap must be cut as soon as growth starts.

Fig. 14.—A union wrapped with electrician's tape, which has the advantage of rather rapid disintegration and does not need to be cut

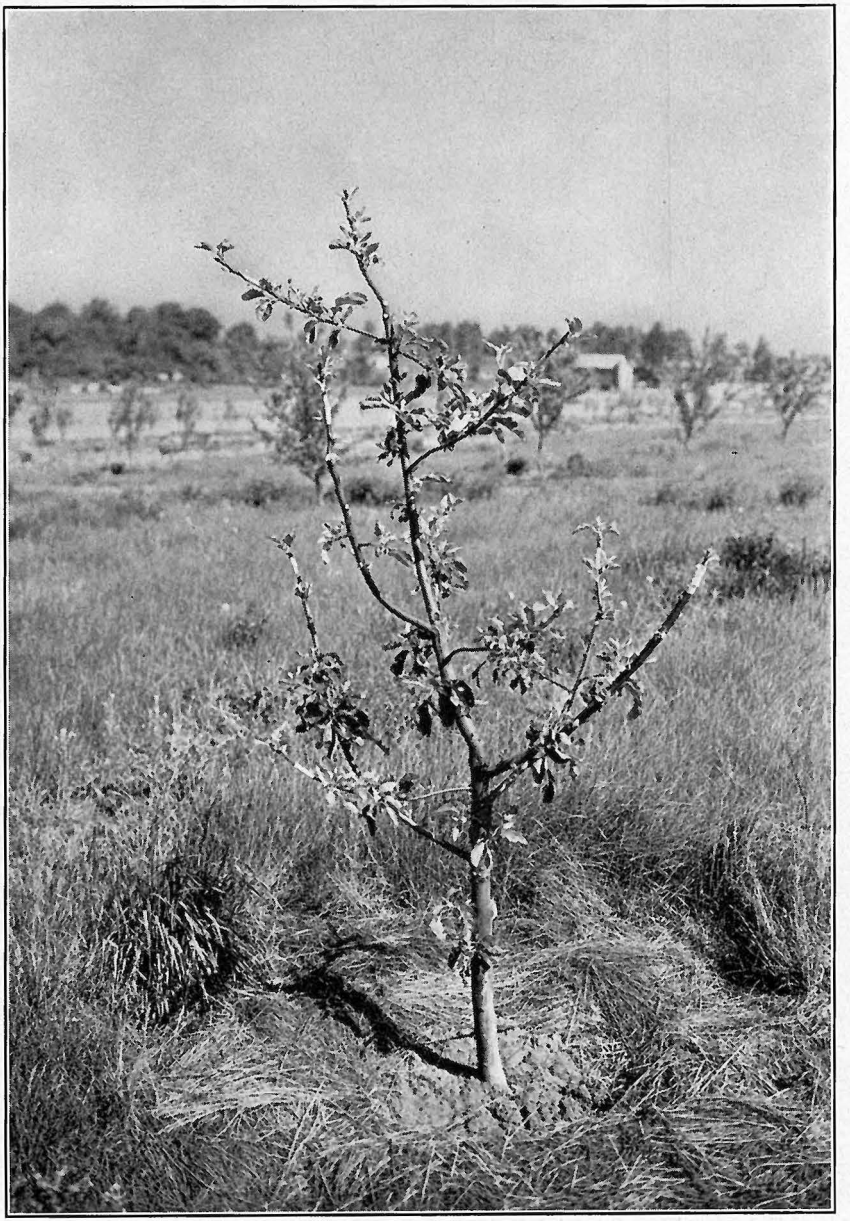

Fig. 15.—A whip grafted tree a week after grafting
Scions are starting growth.

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